Exhibit 2

Summary of Opinions

I have conducted a computation fluid dynamic simulation of a typical operating room and knee implant surgery procedure. In creating the three-dimensional model of the operating room and its setup, many assumptions were made to reduce the effects of the Bair Hugger patient warming system on disrupting the ventilation air flow. For example, the HVAC system modeled is superior to many, if not all, the HVAC systems used in operating rooms. Similarly, the assumptions made for draping, particle count, position of lights, etc. are all in favor of reducing the disruption caused by the Bair Hugger patient warming system.

Based upon my education, training, experience, and the computation fluid dynamics analysis discussed in Exhibit A, I will offer the following general causation opinions within a reasonable degree of engineering certainty:

1. The use of a Bair Hugger Model 750 Blower with the Bair Hugger Upper Body blanket disrupts the turbulent airflow around the operating table.

2. The use of a Bair Hugger Model 750 Blower with the Bair Hugger Upper Body blanket significantly increases the particle count over the surgical site, operating table, and side tables.

3. The use of a Bair Hugger Model 750 Blower with the Bair Hugger Upper Body blanket significantly reduces the effect of the operating room's HVAC system in protecting the surgical site from contaminants.

4. The use of a Bair Hugger Model 505 Blower with the Bair Hugger Upper Body blanket will have the same effects as stated in items 1 through 3 above, but at a reduced temporal rate, i.e. it would take longer time to observe the same effects of BH Model 750.

5. The Bair Hugger patient warming system significantly increases the number of contaminants reaching the operating table.

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Nationality : U.S.A.

Education :

Degree	**Year**	**Institution**
M.Sc. (Mechanical Engineering)	1971	Univ. of Southern California, Los Angeles, USA.
Ph.D. (Mechanical Engineering)	1974	Imperial College, University of London, England.
D.Sc. (Mechanical Engineering)	1999	Imperial College, University of London, England.

Professional Activities (partial list)

Member of the National Academy of Engineering.
Fellow of the American Physical Society.
Fellow of the American Association for the Advancement of Science.
Fellow of the American Society of Mechanical Engineers.
Visiting Fellow of Cambridge University, Wolfson College, England, 1999.
Senior Award of International Conference on Multiphase Flow, Florence, Italy, May 25, 2016.
Chair of the Nominating Committee of American Physical Society, Div. Fluid Dynamics (2014-2015).
Member of Fellowship Committee of American Physical Society, Div. Fluid Dynamics (2009-11).
Member of Science and Engineering Advisory Committee (SETAC) of Blue Waters supercomputer project(2016-2017). https://bluewaters.ncsa.illinois.edu/setac
Senior member of the American Institute of Aeronautics and Astronautics(AIAA).
Member of the Combustion Institute.
Member of EuroMech.
Member of the Editorial Advisory Board of International J. of Multiphase Flow(2010-present).
Guest Editor of International J. of Multiphase Flow, Special Issue on Point-particle model for disperse turbulent flows, vol. 35, 2009.
DIC: Diploma of Membership of Imperial College in Mech. Engineering, 1974.
British Science Research Council (SRC) Scholarship (1971-1974).

Major Research Interests

Direct numerical simulation of turbulent flows, including multiphase and chemaically-reacting flows, and biomedical flows.

Research and Professional Experience

March 2015 -Present **UC Distinguished Professor**, Mechanical and Aerospace Engineering Department, University of California, Irvine.

July 1985 - Feb. 2014 **Professor**, Mechanical and Aerospace Engineering Department, University of California, Irvine.

July 1997 -	June 2002	**Chairman**, Mechanical and Aerospace Engineering Department, University of California, Irvine.
Aug. 1984 -	July 1985	**Visiting Scientist**, DFVLR, German Aerospace Research Establishment, Institute of Atmospheric Physics, Oberpfaffenhofen, West Germany (Sabbatical Year).
July 1983 -	July 1984	**Vice Chairman** , Mechanical Engineering Department, University of California, Irvine.
July 1982 -	June 1985	**Associate Professor**, Mechanical Engineering Department, University of California, Irvine.
July 1978 -	June 1982	**Assistant Professor**, Mechanical Engineering Department, University of California, Irvine.
Jan. 1978 -	June 1978	**Staff Research Engineer**, Acurex Corporation, Aerotherm Division, Mountain View, California.
Oct. 1974 -	Dec. 1977	**Group Leader**, CHAM, (Concentration, Heat and Momentum), London, England and Huntsville, Alabama.

Reviewer for:

Journal of Fluid Mechanics
Physics of Fluids
Nature
Science
Physical review Letters
International Journal of Multiphase Flow
Journal of Combustion Science and Technology
Combustion and Flame
Journal of American Institute of Aeronautics and Astronautics
Journal of Fluids Engineering
Journal of Heat Transfer
International Journal of Numerical Heat Transfer
International Journal of Heat and Mass Transfer
International Journal of Heat and Fluid Flow
Progress in Energy and Combustion Science
Journal of Applied Mathematical Modeling
National Science Foundation
NASA
Department of Energy
University of California Energy Research Group
McGraw Hill Book Co.
John Wiley Book Co. and Wiley Interscience Europe.

Consulting

1974 - 1978
NASA- Lewis, NASA- Langley, NASA- Marshall, AFOSR, ARO, ONR

Westinghouse, General Electric, Airesearch
ALCAN, ALCOA, Corning, Phillip Morris
Ballistic Missile Advance Technology Center
Rolls-Royce, England
Rheinmetall, Germany
Societe National des Poudres et Explosifs, France
Spectron Development Labs.

1981 - 1996
Jet Propulsion Laboratory
Ballistic Missile Advance Technology Center
R&D Associates
Physical Research Inc.
P D A Engineering
1978 - 2000
Science Applications Inc.

Invited Keynote and Distinguished Lectures since 2000

L1. Elghobashi, S. " On the two-fluid and trajectory approaches for DNS of turbulent particle-laden flows", Part 1: DNS of bubble-laden flows via the two-fluid approach, [**Invited Lecture**] Von Karman Institute for Fluid Dynamics, Rhode-Saint-Genese, **Belgium**, April 3-7, 2000.

L2. Elghobashi, S. " On the two-fluid and trajectory approaches for DNS of turbulent particle-laden flows", Part 2: On the approximation of the two-way coupling terms in the trajectory approach, [**Invited Lecture**] Von Karman Institute for Fluid Dynamics, Rhode-Saint-Genese,
Belgium, April 3-7, 2000.

L3. Elghobashi, S. " On the point-force approximation in DNS of prticle-laden turbulent flows with two-way coupling", [**Invited lecture**] ERCOFTAC Conference on Dynamics of Particle-Laden Flows, Zurich, **Switzerland**, July 3-5, 2000.

L4. L4. Elghobashi, S. "Recent Advance in DNS of Particle-Laden Turbulent Flows" [**Invited Plenary lecture**], XI Congress on Numerical Methods and their Applications, ENIEF 2000 , San Carlos de Bariloche, **Argentina**, November 20-24, 2000.

L5. L5. Elghobashi, S. "The physical mechanisms of modifying the structure of turbulent homogeneous flows by dispersed particles ", [**Invited Plenary Lecture**], ERCOFTAC Conference on Small Particles in Turbulence , Seville, **Spain**, March 11-13, 2002.

L6. S. Elghobashi "On the physical mechanisms of drag reduction in a mirobubble-laden turbulent boundary layer" [**Keynote Lecture**] **at The 5th International Con-**

ference of Multiphase Flow (ICMF 2004), Yokohama, **Japan,** May 31 - June 3, 2004.

L7. S. Elghobashi "On the drag reduction in a mirobubble-laden spatially-developing turbulent boundary layer", **IUTAM Symposium** on Recent advances in disperse multiphase flow simulation- [**Invited Lecture**]- Chicago-October 2004.

L8. S. Elghobashi " Reynolds number effect on drag reduction in a microbubble-laden spatially-developing turb. boundary layer", **Euromech Conference on Hydrodynamics of bubbly flows-** [**Invited Lecture**]- Lorentz Center, Leiden, **the Netherlands,** June 6-8, 2005.

L9. S. Elghobashi "On drag reduction in a microbubble-laden spatially-developing turbulent boundary layer", **European Science Foundation- Challenging Turbulent Lagrangian Dynamics,** [**Invited Lecture**]- Castel Gandolfo, **Italy,** Sept. 1-4, 2005.

L10. S. Elghobashi "On drag reduction in a microbubble-laden spatially-developing turbulent boundary layer", **Thirteen IUTAM Advanced School & Workshop, Particle Dispersion in Turbulent Flows,** [**Invited Lecture I**] - CISM, Udine, **Italy,** September 12-16, 2005.

L11. S. Elghobashi " Reynolds number effect on drag reduction in a microbubble-laden spatially-developing turb. boundary layer", **Thirteen IUTAM Advanced School & Workshop, Particle Dispersion in Turbulent Flows,** [**Invited Lecture II**]- CISM, Udine, **Italy,** September 12-16, 2005.

L12. S. Elghobashi, " Direct simulation of turbulent flows laden with particles or bubbles", CIEMAT : Research Centre for Energy, Environment and Technology, [**Invited Lecture**], Madrid, **Spain,** June 21, 2006.

L13. S. Elghobashi, " DNS of the two-way interactions between dispersed solid particles and turbulent flows", **Workshop on multiphase turbulence: Dust storms, erosion, hurricanes and tornadoes,** [**Invited Lecture**], Xian, **China,** July 16-18, 2007.

L14. S. Elghobashi, " On the two-way interactions between dispersed solid particles and turbulent flows", **European Workshop on Direct and Large-Eddy Simulation,** [**Keynote Lecture**], Trieste, **Italy,** Sept. 8-10, 2008.

L15. S. Elghobashi " On the two-way interactions between dispersed particles and turbulent flows " , **March 2009 Meeting of American Physical Society** Pittsburgh, PA . Bulletin of APS, Vol. 54, 209, [**Invited Lecture**], March 18, 2009.

L16. S. Elghobashi " The physical mechanisms of two-way interactions between dispersed particles and turbulent flows", **Workshop on Clouds and Turbulence Institute for Mathematical Sciences,** Imperial College, [**Invited Lecture**], London, **England,** March 23-25, 2009.

L17. S. Elghobashi " How do inertial particles modify isotropic turbulence ?" **International Workshop- Solving the Riddle of Turbulence: What, Why, and How?** Max Planck Institute for Dynamics and Self-Organization, [**Invited Lecture**], Göttingen, **Germany,** May 6 - May 9, 2009.

L18. S. Elghobashi "How do inertial particles modify isotropic turbulence ?" **International Symposium on Turbulence"**, [**Invited Lecture**], Peking University, **Beijing, China,** Sept. 21-25, 2009.

L19. S. Elghobashi "How do inertial particles modify isotropic turbulence ?" **4th Latin-American Workshop on CFD "**, [**Keynote Lecture**], **Rio de Janiero, Brazil,** July 11-14, 2010.

L20. S. Elghobashi "On turbulence modulation by dispersed inertial particles"
13th European Turbulence Conference, ETC 13, [Keynote Lecture] University of Warsaw, Poland, September 12-15, 2011.

L21. F. Lucci, V.S. Lvov, A. Ferrante and S. Elghobashi, "Eulerian-Lagrangian bridge for the energy and dissipation spectra in homogeneous turbulence", [**Invited Lecture**], International Workshop on "Lagrange versus Euler for turbulent flows",
Wolfgang Pauli Institute, Vienna, Austria, May 7-12, 2012.

L22. S. Elghobashi "On the multi-way interactions between turbulent flows and suspended sediment"
International symposium on two-phase modeling for sediment dynamics in geophysical flows(THESIS-2013) [Keynote Lecture] Chatou, Paris, France, June 10-12, 2013.

L23. S. Elghobashi "On the multi-way interactions between turbulent flows and suspended particles"
Fluid-Mediated Particle Transport in Geophysical Flows (GEOFLOWS13), Kavli Institute for Theoretical Physics [Invited Lecture] UCSB, Santa Barbara, California, December 10, 2013.

L24. S. Elghobashi " Modulation of isotropic turbulence by dispersed particles," **Huazhong University of Science and Technology, Wuhan, China,** June 9, 2014. [**Plenary Lecture**].

L25. S. Elghobashi "Homogeneous shear turbulence modulation by dispersed small

particles," **Huazhong University of Science and Technology, Wuhan, China,** June 10, 2014. [**keynote Lecture**].

L26. S. Elghobashi "Modulation of isotropic turbulence by finite-size particles," **Huazhong University of Science and Technology, Wuhan, China,** June 11, 2014. [**keynote Lecture**].

L27. S. Elghobashi "How do dispersed inertial particles modify turbulent flows," Department of Mechanics and Engineering Science, **Peking University, China,** June 17, 2014 . [**Distinguished lecture**].

L28. S. Elghobashi "How do dispersed inertial particles modify turbulent flows," Center for Turbulence Research, **Stanford University,** July 25, 2014. [**Distinguished lecture**].

L29. S. Elghobashi "How do dispersed inertial particles modify turbulent flows," Computational and Applied Mathematics, **Pennsylvania State University,** October 10, 2014. [**Distinguished lecture**].

L30. S. Elghobashi "How do dispersed inertial particles modify turbulent flows," Aerospace Engineering department, **University of Minnesota,** April 21, 2015. [**Distinguished lecture**].

L31. S. Elghobashi "How do dispersed inertial particles modify turbulent flows," Mechanical Engineering department, **Northwestern University,** February 1, 2016. [**Distinguished lecture**].

L32. S. Elghobashi "How do dispersed inertial particles modify turbulent flows," Mechanical Engineering department, **MIT,** February 3, 2016. [**Distinguished lecture**].

Publications

Articles in Books

B1 Elghobashi, S.E., "Studies in the Prediction of Turbulent Diffusion Flames", **Studies in Convection**, Vol. 2, B.E. Launder, ed., Academic Press, London, (1977).

B2 Elghobashi, S. E.,and Nomura, K.N., "Direct Simulation of a Passive Diffusion Flame in Sheared and Unsheared Homogeneous Turbulence", **Turbulent Shear Flows 7** , pp. 313-329, W.C. Reynolds, ed., Springer-Verlag , (1991).

B3 Elghobashi, S. E. "Direct Simulation of turbulent flows laden with dispersed particles ", **Handbook on Multiphase Flow** , pp. 13-34:13-60, C. Crowe, ed., CRC , (2005).

B4 Elghobashi, S. E. "An updated classification map of particle-laden turbulent flows ", **Proceedings of IUTAM Symposium on Computational approaches to multiphase flow** , Springer pp. 3-10, , (2006).

B5 Loy, A.C., Jing, J., Zhang, J., Wang., Y., Elghobashi, S., Chen, Z. and Wong, B.J.F. "Anatomic optical coherence tomography of upper airways", **Optical Coherence Tomography: Technology and Applications,** Ed. W. Drexler and J. Fujimoto, Springer, Chapter 75, pp. 1145-2262, (2015).

Guest Editor

Elghobashi, S.E. " Point-Particle Models for Disperse Turbulent Flows", **International Journal of Multiphase Flow, Special Issue**, Volume 35, Issue 9, Pages 791-878, (September 2009).

Journal Papers

J1 Elghobashi, S.E., Pun, W.M. and Spalding, D.B., "Concentration Fluctuations in Isothermal Turbulent Confined Coaxial Jets",
Chem. Eng. Sci., Vol. 32, pp. 161-166 (1977).

J2 Elghobashi, S.E. and Wassel, A.T., "The Effect of Turbulent Heat Transfer on the Propagation of an Optical Beam Across Supersonic Boundary and Free Shear Layers",
Int. J. Heat and Mass Transfer, Vol. 23,pp.1229-1241 (1980).

J3 Elghobashi, S.E., Samuelsen, G.S., Wuerer, J.E., and LaRue, J.C., " Prediction and Measurement of Mass, Heat and Momentum Transport in a Nonreacting Turbulent Flow of a Jet in an Opposing Stream",
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J4 Megahed, I.E.A. and Elghobashi, S.E., "On the Numerical Solution of Indeterminate Steady Elliptic Flows",
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J5 Elghobashi, S.E. and Megahed, I.E.A., "Mass and Momentum Transport in a Laminar Isothermal Two-Phase Round Jet",
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J6 Elghobashi, S.E. and Abou Arab, T.W., "A Two-Equation Turbulence Model for Two-Phase Flows",
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J7 Elghobashi, S.E. and Launder, B.E., "Turbulent Time Scales and the Dissipation Rate of Temperature Variance in the Thermal Mixing",
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J8 Modarress, D., Tan, H. and Elghobashi, S.E., "Two-Component LDA Measurement in a Two-Phase Turbulent Jet",
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Chemical Engineering Communications, Vol. 28, pp. 341-354 (1984).

J10 Wassel, A.T. and Elghobashi, S.E., "Mathematical Simulation of Ocean Thermal Energy Conversion Sea Water Systems",
J. Solar Energy Engineering Vol. 106, pp. 198-205 (1984).

J11 Mostafa A.A. and Elghobashi, S.E., "A Study of the Motion of Vaporizing Droplets in a Turbulent Flow",
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J12 Elghobashi, S.E., Abou-Arab, T., Rizk, M. and Mostafa, A., "Prediction of the Particle-Laden Jet with a Two-Equation Turbulence Model",
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J. of Engineering for Power, Vol. 107, pp. 744-757 (1985).

J14 Rizk, M., and Elghobashi, S.E., "Wall Effects on the Motion of a Spherical Particle Suspended in a Turbulent Flow",
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J15 Mostafa, A.A. and Elghobashi, S.E., "A Two-Equation Turbulence Model for Jet Flows Laden with Vaporizing Droplets",
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J16 Schumann, U., Elghobashi, S.E., and Gerz, T., "Direct Simulation of Stably Stratified Turbulent Homogeneous Shear Flows",
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J18 Conner, J. and Elghobashi, S.E., "Numerical Solution of Laminar Flow Past a Sphere with Surface Mass Transfer",
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J19 Rizk, M. and Elghobashi, S.E., "A Two-Equation Turbulence Model for Dispersed Dilute Two-Phase Confined Flows",
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J23 Elghobashi, S. E.,and Truesdell, G.C., "Direct Simulation of Particle Dispersion in a Decaying Isotropic Turbulence",
J. Fluid Mechanics, vol. 242, pp. 655-700 (1992).

J24 Nomura, K.N.,and Elghobashi, S. E. "Mixing characteristics of an inhomoge-

neous scalar in isotropic and homogeneous sheared turbulence",
Physics of Fluids, vol. 4, pp. 606-625 (1992).

J25 Kim, I. , Elghobashi, S. E., and Sirignano, W. " Three- dimensional flow over two spheres placed side by side",
J. Fluid Mechanics, vol. 246, pp. 465-488 (1993).

J26 Nomura, K.N.,and Elghobashi, S. E. " The structure of inhomogeneous turbulence in variable density nonpremixed flames",
Theoretical and Computational Fluid Dynamics, vol. 5, pp. 153-176 (1993).

J27 Elghobashi, S. E., and Truesdell, G.C., " On the two-way interaction between homogeneous turbulence and dispersed solid particles ; Part 1 : turbulence modification",
Physics of Fluids, vol. A5, pp. 1790-1801 (1993).

J28 Elghobashi, S. E., 'On Predicting Particle-Laden Turbulent Flows' ,
J. Applied Scientific Research, Vol. 52, 4, pp. 309-329 (1994).

J29 Truesdell, G.C., and Elghobashi, S. E." On the two-way interaction between homogeneous turbulence and dispersed solid particles ; Part 2 : particle dispersion",
Physics of Fluids, Vol. 6, pp. 1405-1407 (1994).

J30 Kim, I. , Elghobashi, S. E., and Sirignano, W. " Unsteady flow interactions between an advected cylindrical vortex tube and a spherical particle",
J. Fluid Mechanics, Vol. 288, pp. 123-155 (1995).

J31 Boratav, O. , Elghobashi, S. E., and Zhong, R. " On the alignment of the $\alpha-$strain and vorticity in turbulent nonpremixed flames",
Physics of Fluids, Vol. 8, pp. 2251-2253 (1996).

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International J. Multiphase Flow, Vol. 23, pp. 1-23 (1997).

J33 Druzhinin, O. and Elghobashi, S., ' DNS of bubble-laden turbulent flows using the two-fluid formulation',
Physics of Fluids, Vol. 10, pp. 685-697 (1998).

J34 Kim, I. , Elghobashi, S. E., and Sirignano, W. ' On the equation for spherical particle motion : effects of Reynolds and acceleration numbers',
J. Fluid Mechanics, Vol. 367, pp. 221-253 (1998).

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vorticity and scalar gradient in turbulent, buoyant, nonpremixed flames',
Physics of Fluids, Vol. 10, pp. 2260-2267 (1998).

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J54 Cleckler, J., Elghobashi, S. and Liu, F. 'On the motion of inertial particles by sound waves'
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Archival Conference Papers

C1 Elghobashi, S.E. and Pun, W.M., "A Theoretical and Experimental Study of Turbulent Diffusion Flames in Cylindrical Furnaces", **Proceedings of Fifteenth Symposium (International) on Combustion**, (1974).

C2 Elghobashi, S.E., Pratt, D.T., Spalding, D.B. and Srivatsa, S.K., "Unsteady Combustion of Fuel Spray in Jet Engine Afterburners", **Proceedings of Third International Symposium on Air Breathing Engines**, Munich (1976).

C3 Elghobashi, S.E. and Launder, B.E., "Modeling the Dissipation Rate of Scalar Fluctuations in a Thermal Mixing Layer", **Proceedings of Third Symposium on Turbulent Shear Flows**, (1981).

C4 Elghobashi, S.E. and Abou Arab, T.W., "A Second Order Turbulence Model for Two-Phase Flows", **Proceedings of Seventh International Heat Transfer Conference**, Munich (1982).

C5 Elghobashi, S.E. and Prud'homme, M., "On the Accuracy and Stability of Quadratic Upstream Differencing in Laminar Elliptic Flows", **Numerical Methods in Laminar and Turbulent Flow**, ed. Taylor, C., Johnson, J., and Smith, W., Pineridge Press, U.K., pp. 317-327 (1983).

C6 Mostafa A.A. and Elghobashi, S.E., "A Study of the Motion of Vaporizing Droplets in a Turbulent Flow", **Proceedings of Ninth International Colloquium and Dynamics of Explosions and Reactive Systems**, Poitiers, France, July (1983).

C7 Elghobashi, S.E., Abou Arab, T.W., Rizk, M. and Mostafa, A., "A Mathematical Model of the Turbulent Two-Phase Round Jet",**Proceedings of Fourth International Symposium on Turbulent Shear Flows**, Karlsruhe,
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Invited Research Presentations (1983- Present)

"How do dispersed inertial particles modify turbulent flows ?" **École Polytechnique,** The Hydrodynamics Laboratory (LadHyX), **Palaiseau, France,** June 14, 2013.

"How do dispersed inertial particles modify turbulent flows ?" **University of California, San Diego,** Mechanical and Aerospace Engineering Dept., June 3, 2013.

"Direct numerical simulation of the flow in the upper airway via lattice Boltzmann method" **National Institute of Health,** Bethesda, MD, April 29, 2013.

"On the physical mechanisms of drag reduction in a spatially-developing turbulent boundary layer laden with microbubbles " **École Normal Supérieur, Paris, France,** March 17, 2011.

"Direct numerical simulation of the flow in the upper airway via lattice Boltzmann method" **National Institute of Health,** Bethesda, MD, Feb. 24, 2011.

"Turbulence modulation by dispersed inertial particles" Mech. Eng. Dept., **Univ. of California, Berkeley,** February 11, 2011.

" On the two-way interactions between dispersed particles and turbulent flows" **School of Engineering and Mathematical Sciences, City University, London, England,** March 26, 2009.

"On the effects of finite-size solid particles on decaying isotropic turbulence", **Institut de Mècanique des Fluides de Toulouse, IMFT, Toulouse, France,** June 28, 2007.

"On the physical mechanisms of drag reduction in a spatially-developing turbulent boundary layer laden with microbubbles " **Ecole Polytechnique,** The Hydrodynamics Laboratory (LadHyX), **Palaiseau, France,** June 26, 2007.

"Turbulence modification in flows laden with particles or bubbles" **The Johns Hopkins University,** Mechanical Engineering Department, February 15, 2007.

" Direct simulation of turbulent flows laden with particles or bubbles", **Invited Lecture, CIEMAT : Research Centre for Energy, Environment and Technology, Madrid, Spain, June 21, 2006.**

"On drag reduction in a spatially-developing turbulent boundary layer laden with microbubbles", **Department of Mechanics and Aeronautics, University of Rome "La Sapienza", Rome,, Italy,** September 5, 2005.

"On the drag reduction in a mirobubble-laden spatially-developing turbulent boundary

layer," **School of Mechanical and Aerospace Engineering, Center for Turbulence and Flow Control Research, Seoul National University, Seoul, South Korea**, May 27, 2005.

"On the physical mechanisms of drag reduction in a mirobubble-laden turbulent boundary layer", **Department of Mechanical Engineering, University of Tokyo, Japan, June 7, 2004.**

"On the physical mechanisms of drag reduction in a spatially-developing turbulent boundary layer laden with microbubbles", **Mech. Eng. Dept., Univ. California, Santa Barbara, California**, February 14, 2004.

"Recent advances in DNS of particle-laden turbulent flows ", **Institute for Scientific Computing Research, Lawrence Livermore Research Laboratory, Livermore, California** , August 7, 2003.

"DNS of turbulent flows laden with particles ", **Institute for Scientific Computing Research, Lawrence Livermore Research Laboratory, Livermore, California** , March 27, 2003.

" On the physical mechanisms of modifying the structure of turbulent homogeneous shear flows by dispersed particles", **Mechanical Engineering Dept., Stanford University, Stanford, California,** October 30, 2001.

"Recent Advances in DNS of Turbulent Flows Laden with Particles, Droplets or Bubbles", **Universite Pierre et Marie Curie, Paris, France**, September 19, 2001.

"Recent advances in direct numerical simulations (DNS) of turbulent shear flows laden with particles ", **Institute for Scientific Computing Research, Lawrence Livermore Research Laboratory, Livermore, California** , May 4, 2001.

"Recent Advances in DNS of Turbulent Flows Laden with Particles, Droplets or Bubbles", **The Aerospace Corporation, Los Angeles, California**, April 17, 2001.

"Recent advances in direct numerical simulations (DNS) of turbulent shear flows laden with particles ", **Institute for Scientific Computing Research, Lawrence Livermore Research Laboratory, Livermore, California** , May 4, 2001.

" On the physical mechanisms of modifying the structure of turbulent homogeneous shear flows by dispersed particles ", **ETH, Zürich, Switzerland**, October 4, 2000.

" Recent advances in direct numerical simulations (DNS) of turbulent shear flows laden with particles ", **Paul Scherer Institute, Villigen, Switzerland**, October 3, 2000.

" Recent advances in direct numerical simulations (DNS) of turbulent shear flows laden with particles and bubbles", **Mechanical Engineering Department, Imperial College, London**, April 6, 2000.

" Recent advances in direct numerical simulations (DNS) of turbulent shear flows laden with particles and bubbles", **Mechanical and Aerospace Engineering Department, Univ. California, San Diego**, March 15, 2000.

" Direct numerical simulation of particle-laden flows: the trajectory and two-fluid approaches", **Dept. of Mechanical Engineering, Univ. of Illinois, Urbana-Champaign**, November 9, 1999.

" Evolution of flame surface in buoyant and nonbuoyant turbulent nonpremixed reactions", **Graduate Aeronautical Laboratories, California Institute of Technology,** January 16, 1998.

" How do particles modify the turbulence energy in a homogeneous shear flow ?", **Department of Chemical Engineering, Univ. of California, Santa Barbara,** April 16, 1997.

" Direct numerical simulation of particle-laden homogeneous turbulent shear flows", **CEA : Atomic Energy Commision - Military Applications Division,** Bordeaux, France, April 2, 1997.

" Mathematical models of particle-laden flows", **CEA : Atomic Energy Commision - Military Applications Division,** Bordeaux, France, April 2, 1997.

" DNS of surface topology of turbulent nonpremixed flames ", **CEA : Atomic Energy Commision - Military Applications Division,** Bordeaux, France, April 2, 1997.

"Effects of buoyancy on turbulent diffusion flames", Dept. of Mechanical Engineering, **Yale University**, June 10, 1996.

"Particle dispersion and turbulence modification in a homogeneous shear flow", Dept. of Mechanical Engineering, **California Institute of Technology**, April 23, 1996.

" Particle dispersion and turbulence modulation in a homogeneous shear flow", Aerospace Engineering Dept., **University of Southern California,** October 4, (1995).

" DNS of particle dispersion in homogeneous shear turbulence" **Institut de Mecanique des Fluides de Toulouse, Toulouse, France**, September 12, (1995).

" DNS of a turbulent diffusion flame under different gravity conditions" **Institut de Mecanique des Fluides de Toulouse, Toulouse, France,** September 12, (1995).

" DNS of particle dispersion in homogeneous shear turbulence" **Technical University of Delft, Delft, Netherlands**, September 7, (1995).

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" On the two-way interaction between homogeneous turbulence and dispersed solid particles",**Naval Command, Control and Ocean Surveillance Center, San Diego, CA,** Oct. 19, 1993.

" On the two-way interaction between homogeneous turbulence and dispersed solid particles", **Arizona State University, Tempe, Arizona**, Oct. 8, 1993.

" Direct numerical simulation of particle dispersion and turbulence modulation in homogeneous turbulence",**NATO Advanced Research Workshop on Chaotic Advection, Tracer Dynamics, and Turbulent Dispersion, Alessandria, Italy,** May 24-28, 1993.

" On predicting particle-laden turbulent flows", Workshop on turbulence in particulate multiphase flow,**Fluid Dynamics Laboratory, Battelle Pacific Northwest Laboratory, Richland, WA,** March 22, 1993.

" On the two-way interaction between homogeneous turbulence and dispersed solid particles", **AMES Dept. Univ. of California, San Diego,** February 5, 1993.

" On the two-way interaction between homogeneous turbulence and dispersed solid particles",**NASA Langley Research Center,** December 14, 1992.

" On the modification of energy spectrum of homogeneous turbulence by dispersed solid particles",**Department of Mathematics, UCI,** May 21, 1992.

" The two-way coupling between solid particles and homogeneous decaying turbulence", **Mechanical and Aerospace Engineering Department, Princeton University,** August 23, 1991.

" Direct simulation of particle-laden homogeneous turbulence",**Los Alamos National Laboratory,** May 25, 1991.

"The effect of turbulence on the propagation of an electromagnetic wave in a compressible turbulent boundary layer", Workshop on Aerothermal Technology Development,**U.S. Strategic Defense Command , Huntsville, Alabama,** June 13, 1991.

"Direct numerical simulation and closure modelling of particle-laden turbulent flows", Workshop on Turbulence Simulation and Modelling , **NASA-Marshall, Huntsville,**

Alabama, April 14-15, 1991.

"Direct numerical simulation of particle dispersion in sheared and unsheared homogeneous turbulence", **Mechanical Engineeing Department, University of Southern California,** March 1, 1990.

"Direct numerical simulation and modelling of particle-laden turbulent flows", **German Aerospace Organization (DLR), Munich, Germany,** December 4,1989.

"Direct numerical simulation of particle dispersion in homogeneous turbulent flows", **University of Kaiserslautern , West Germany,** December 5,1989.

"Direct numerical simulation of particle dispersion in isotropic and sheared turbulent flows", **Institut de Mecanique des Fluides, Toulouse, France,** December 6,1989.

"Direct numerical simulation of particle dispersion in homogeneous turbulent flows", **University of Rouen, France,** December 7,1989.

"Direct numerical simulation and modelling of particle-laden turbulent flows",**Shell Conference on Computational Fluid Dynamics, Apeldoorn, The Netherlands,** December 11,1989.

"Direct numerical simulation of particle dispersion in homogeneous turbulent flows", **Norway Institute of Technology, Trondheim, Norway,** December 15,1989.

"Direct numerical simulation of particle dispersion in grid-generated turbulence", Workshop on droplets and sprays,**AFOSR and ONR Contractors Meeting, Ann Arbor, Michigan,** June 21,1989.

"Direct numerical simulation of particle dispersion and chemical reaction in turbulent flows",**G.M. Research Laboratory, Thermal Science Department, Warren, Michigan,** June 22,1989.

"Direct numerical simulation of stratified turbulent homogeneous shear flow", **Idaho National Engineering Laboratory, Idaho Falls,** September 8,1988.

"Direct numerical simulation of stratified turbulent homogeneous shear flow",**Center for Microgravity and Materials Research, University of Alabama, Huntsville** , August 5, 1988.

"Direct simulation of stable stratified turbulent homogeneous shear flows", Third International Symposium on Stratified Flows, **California Institute of Technology,** February 3-5, 1987.

"Direct simulation of the passive-scalar mixing layer",**Institut de Mecanique des Fluides, Toulouse, France,** September 11, 1987.

"Direct simulation of stratified homogeneous turbulent shear flow",**Department of Aerospace Engineering, University of Southern California,** October 8, 1986.

"Direct simulation of stratified homogeneous turbulent shear flow", **Institut de Mecanique Statistique de la Turbulence, Marseille, France,** October 22, 1986.

"Direct simulation of homogeneous turbulent shear flow", **Mechanical Engineering Department, University of California, Irvine,** July 22, 1986.

"Direct simulation of stratified homogeneous turbulent shear flow",**AMES Department, University of California, San Diego,** February 3, 1986.

"Direct simulation of turbulent shear flow with buoyancy",**Jet Propulsion Laboratory, California Institute of Technology,** May 30, 1986.

"Direct numerical simulation of a turbulent homogeneous shear flow with buoyancy", **Mechanical Engineering Dept., University of California, Irvine,** October 18, 1985.

"Direct simulation of turbulent homogeneous shear flow", **DFVLR, Institute of Atmospheric Physics, Oberpfaffenhofen, West Germany ,** June 21, 1985.

"Prediction of the turbulent jet laden with vaporizing droplets" **Dept. of Fluid Mechanics, University of Erlangen, West Germany,** May 22,1985.

"Experimental study of the turbulent jet laden with particles", **University of the German Armed Forces, Aerospace Department, Munich, West Germany,** February 7,1985.

"Measurement and prediction of the turbulent two-phase jet", **University of Karlsruhe, Mechanical Engineering Dept.,** December 13,1984.

"Prediction of the turbulent jet laden with solid spherical particles",**DFVLR, Institute of Atmospheric Physics, Oberpfaffenhofen, West Germany** , December 5, 1984.

"Recent developments in mathematical modeling of dispersed two- phase flows", presented at the Mechanical Engineering Dept., Technical University of Munich, West Germany, November 27,1984.

"Recent developments in mathematical modeling of dispersed two- phase flows", presented at the **Mechanical Engineering Dept., University of California, Berkeley,** March 20, 1984.

"Effects of dispersed two-phase flows on turbulence structure", **Office National d'Etudes et de Recherches Aerospatiales (ONERA), Paris, France,** September 19, 1983.

"Turbulence modulation in a turbulent two-phase jet : theory and experiment", Mechanical Engineering Department, **University of Kaiserslautern, West Germany,** September 16, 1983.

"Passive-scalar time-scales in turbulent flows", **DFVLR, Institute of Atmospheric Physics, Oberpfaffenhofen, West Germany ,** September 15, 1983.

"Mathematical models of temperature variance and time-scales for the thermal mixing layer ", **Institut de Mecanique Statistique de la Turbulence, Marseille, France,** July 8, 1983.

"Experimental and theoretical study of dispersed two-phase turbulent jets", **Institut de Mecanique des Fluides, Toulouse, France,** July 6, 1983.